

THE MUTATION OF *HIBISCUS MOSCHEUTOS* L.

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The views of De Vries on the origin of species by mutation rest upon the result of seventeen years of experimentation. This botanist holds that new elementary species arise suddenly without transition or intermediate forms, and that these species are constant from the moment of their origin and show no resemblance in their characters to the individual variations exhibited by the parent type. De Vries believes that mutability occurs only at certain periods, and a species might continue in existence indefinitely without giving rise to new forms. This succinctly states the position of the illustrious Dutch botanist upon the origin of species.

The observations here recorded are given with the hope that they may add somewhat to the discussion of the problems opened up by the work of De Vries.

*Hibiscus moscheutos* L., the swamp rose mallow, is found abundantly at Sea Side Park, N. J., where it covers acres of the salt marshes. Here, undisturbed by man, the plants offer special advantages for study. It was noticed that no two plants growing in the open meadow were exactly alike. Consequently, a study was instituted to determine, if possible, the character of the divergences. All of the plants studied grew practically under the same conditions, although in certain places the soil of the meadow was wetter than in others. So as to make the observations continuous for a number of years and upon the same plants, stakes were driven into the marsh at the base of each plant collected and studied. These stakes were marked by cutting Roman numerals into a planed-off portion at the top.

The plants numbered I-XII grew in a wet portion of the meadow near an open slue. Those designated as XIII to XXV grew in the drier portions of the meadow, excepting XXV, which grew beside a hole filled throughout the season with water. Specimens of these plants were submitted to Prof. De Vries, who pronounced upon them as follows, extracted from a letter dated November 26, 1902: "I have studied the *Hibiscus moscheutos* with the greatest interest, and believe, with you, that you have hit at cases of mutation parallel to that of

*Oenothera Lamarckiana*." The writer at least hopes that more detailed observations will confirm the encouraging words of Prof. De Vries. However, to know whether the mutability is still working, or whether the period has already come to a close, it is of course necessary to make sowing experiments. This was done last fall at Sea Side Park, where seeds obtained from capsules that had matured were marked by stakes and sown in a portion of the meadow destitute of the rose mallow to determine among the different forms which is the original and mutating one, because it is probable that the others would no more mutate or do so only in a restricted manner. Seeds of the several marked plants were also kept for future sowing.

All of the plants studied, with the exception of plants III, IV, V, XII, XVII, were more than of one year's duration. As is well known, *Hibiscus moscheutos* L. is perennial and persists for a number of years. The doubt might arise in the minds of some botanists that the smaller plants are small because they are juveniles and have not reached full maturity. The size of plants III, IV, V, XII, XVII and the shape of their leaves may be accounted for in this way, but the color of the flowers, leaves and markings can hardly be explained by a reference to the juvenile state, because these plants diverge as widely in appearance as the other twenty adult plants do from each other. The adult plants differ from each other, as do the plants of one year's growth, and the inference is, therefore, that the difference in size, mode of branching, size of leaves, shapes and colors of leaves, character of inflorescences, size and color of the flowers is not dependent upon whether the plant is juvenile or adult, but is due rather to the mutations that they have undergone.

Dried plants do not show the peculiarities of structure in as striking a manner as do living plants. In drying, the plants have lost form, and the color of the flowers and leaves has faded out. As the botanist, however, stands in the salt meadow where *Hibiscus moscheutos* L. abounds and runs his eye over the thousands of plants that are found there, he cannot fail but notice the various striking forms characterized by habit of growth, size and color of the stem, leaves and flowers, that have been produced, as the writer believes, by the process of mutation. One plant is tall and has pure white flowers with bronzed leaves. Another is bright green with rose-pink flowers, while still another plant is corymbosely branched and has deep rose-red flowers. These peculiarities are mentioned as they occur in twenty-five plants gathered in the summer of 1902 for comparative study.